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EXAMINER

FEGGINS, KRISTAL J

ART UNIT	PAPER NUMBER
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2861

DATE MAILED: 12/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/438,786

Applicant(s)

HARA ET AL.

Examiner

K. Feggins

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-- Th MAILING DATE of this communication appears on the cover sheet with the corresponding address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 05 May 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 24-50 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 24-50 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 27.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claim 24,25, 29, 30, 34, 35 are rejected under 35 U.S.C. 102(b) as being anticipated by Saruta et al. (JP 08336970 A, IDS).

#### **Saruta et al. disclose the following claimed limitations:**

- \* an ink jet recording apparatus (see title)

- \* a recording head provided with a nozzle (fig 1), said recording head being operable to jet ink particles through said nozzle based on the flushing/pulse/ signal (Abstract, & Translation);

- \* a flushing signal generating unit operable to generate a flushing signal that causes said recording head to jet only main ink particles through said nozzle so as to not form a mist./teaches piezoelectric oscillator receives signals to form dots on the medium wherein the first and second droplets are combined during flight, thereby not forming a mist.)

- \* wherein the flushing signal generating unit is operable to generate the flushing signal as a periodic signal (fig 3, Abstract and Translation)

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\* said recording head to jet only ink particles with a momentum greater than a predetermined value/time through said nozzle so as to not to form a mist

\* a flushing signal generating unit operable to generate a flushing signal that causes said recording head to intermittently jet sets of ink particles comprising a main ink jet particle and minute ink jet particles after the main ink jet particle through said nozzle, wherein the minute ink jet particle of a previous set combine with the main ink jet particle of a following set in a range of a predetermined distance from said nozzle so that an amount of the minute ink jet particles scattered in mist can be reduced. /teaches piezoelectric oscillator receives signals to form dots on the medium wherein the first and second droplets are combined during flight, thereby reducing mist/ (Abstract and Translation).

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 26, 27, 31, 36, 40, 41, 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saruta et al. (JP 08336970 A, IDS) in view of Kobayashi et al.

(6,036,299)

**Saruta et al. disclose the following claimed limitations:**

- \* the periodic signal having periodic pulses (figs 3)

**Saruta et al. do not disclose the following claimed limitations:**

- \* wherein each of the pulses has a trapezoidal waveform having a first inclined section, a potential maintaining section continuous with the first inclined section and a second inclined section continuous with the potential maintaining section.

wherein each of the periodic pulses has the trapezoidal waveform, and wherein a gradient of the first inclined section is greater than a gradient of the second inclined section (figs 8a-8f) for the purpose of managing ink in an ink cartridge.

- \*further comprising a capping device operable to seal said nozzle of the recording head, wherein said capping device catches the ink particles jetted by said recording head through the nozzle based on the flushing signal (col 3, lines 36-49, col 4, lines 25-38, figs 3 & 10-14) for the purpose of preventing clogging of nozzles.

- \* a member having an opening opposite to which said nozzles of said recording head can be disposed (fig 14)

- \* an ink absorbing member/waste ink tank/ disposed on the side of a bottom part of the opening (see fig 14)

- \* wherein the ink particles jetted by said recording head through said nozzle based on the flushing signal are caught by/contained by/ said ink absorbing member/waste tank/ (fig 14, col 3, lines 36-59, col 4, lines 24-38) for the purpose of providing a printer that is able to overcome the clogging of the nozzles.

\* wherein the flushing signal generating unit is operable to generate the flushing signal separate from a printing signal based on printing data (figs 2-4) for the purpose of controlling the operation of a recording apparatus that effectively discharge the ink.

**Kobayashi et al. discloses the following claimed limitations:**

\* wherein each of the pulses has a trapezoidal waveform having a first inclined section, a potential maintaining section continuous with the first inclined section and a second inclined section continuous with the potential maintaining section<sub>3,8</sub> (col 11, line 66-col 12, line 31, figs 8a-8g) for the purpose of allowing droplets to be discharged speedily.

\* wherein each of the periodic pulses has the trapezoidal waveform, and wherein a gradient of the first inclined section is greater than a gradient of the second inclined section (figs 8a-8f) for the purpose of managing ink in an ink cartridge.

\* further comprising a capping device operable to seal said nozzle of the recording head, wherein said capping device catches the ink particles jetted by said recording head through the nozzle based on the flushing signal (col 3, lines 36-49, col 4, lines 25-38, figs 3 & 10-14) for the purpose of preventing clogging of nozzles.

\* a member having an opening opposite to which said nozzles of said recording head can be disposed (fig 14)

\* an ink absorbing member/waste ink tank/ disposed on the side of a bottom part of the opening (see fig 14)

\* wherein the ink particles jetted by said recording head through said nozzle based on the flushing signal are caught by/contained by/ said ink absorbing member/waste tank/ (fig 14, col 3, lines 36-59, col 4, lines 24-38) for the purpose of providing a printer that is able to overcome the clogging of the nozzles.

\* wherein the flushing signal generating unit is operable to generate the flushing signal separate from a printing signal based on printing data (figs 2-4) for the purpose of controlling the operation of a recording apparatus that effectively discharge the ink.

It would have been obvious at the time of the invention was made to a person having ordinary skill in the art to utilize each of the pulses has a trapezoidal waveform having a first inclined section, a potential maintaining section continuous with the first inclined section and a second inclined section continuous with the potential maintaining section and wherein each of the periodic pulses has the trapezoidal waveform, wherein a gradient of the first inclined section is greater than a gradient of the second inclined section, a member having an opening opposite to which said nozzles of said recording head can be disposed, an ink absorbing member disposed on the side of a bottom part of the opening, wherein the ink particles jetted by said recording head through said nozzle based on the flushing signal are caught by and wherein the flushing signal generating unit is operable to generate the flushing signal separate from a printing signal based on printing data taught by Kobayashi et al. into Saruta et al. for the

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purpose of allowing droplets to be discharged speedily and managing ink in an ink cartridge, providing a printer that is able to overcome the clogging of the nozzles and controlling the operation of a recording apparatus that effectively discharge the ink.

5. Claims 42, 43, 47, 48, 49, 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saruta et al. (JP 08336970 A, IDS) in view of Nakahara (6,042,218).

**Saruta et al. disclose all of the claimed limitations except for the following:**

\* 42, 47 wherein said recording head is provided with a plurality of nozzles respectively for different inks, and said flushing signal generating unit is operable to generate different flushing signals for said plurality of nozzles for jetting the different inks, respectively.

\* a plurality of flushing regions, wherein said recording head is provided with a plurality of nozzles respectively for different inks, and said recording head is operable to jet ink particles of the different inks through said plurality of nozzles to be caught in said plurality of flushing regions, respectively.

**Nakahara discloses the following claimed limitations:**

\* wherein said recording head is provided with a plurality of nozzles respectively for different inks, and said flushing signal generating unit is operable to generate different flushing signals for said plurality of nozzles for jetting the different inks, respectively. (col 2, lines 66-67, col 3-col 6, lines 4-10, 20-56, figs 2-4) for the purpose



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of providing an ink jet printer able to perform flushing with a reduction in unnecessary consumption of ink.

\* a plurality of flushing regions, wherein said recording head is provided with a plurality of nozzles respectively for different inks, and said recording head is operable to jet ink particles of the different inks through said plurality of nozzles to be caught in said plurality of flushing regions, respectively (col 3, line 11-col 5, line 50, col 6, lines 4-10, 20-56, figs 1-4) for the purpose of reducing unnecessary ink consumption.

It would have been obvious at the time of the invention was made to a person having ordinary skill in the art to utilize a recording head provided with a plurality of nozzles respectively for different inks, a flushing signal generating unit operable to generate different flushing signals for the plurality of nozzles for jetting the different inks, a plurality of flushing regions, and is operable to jet ink particles of the different inks through said plurality of nozzles to be caught in said plurality of flushing regions, as taught by Nakahara into Saruta et al. for the purposes of providing an ink jet printer able to perform flushing with a reduction in and reducing the unnecessary consumption of ink.

6. Claims 44-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saruta et al. (JP 08336970 A, IDS) in view of Kobayashi et al. (6,036,299) and Barrett et al. (5,682,191).

**Saruta et al. disclose all of the claimed limitations except for the following:**

\* a fan operable to prevent a temperature rise/cool fan module/ of said ink jet recording apparatus and a fan controller operable to stop said fan during a flushing operation in which said recording head jets ink particles through said nozzle

\* an ink absorbing member operable to absorb the ink particles jetted by said recording head through said nozzle based on the flushing signal, wherein said fan controller keeps said fan stopped at least until the ink particles jetted by said recording head through said nozzle based on the flushing signal arrive at or are caught by the ink absorbing member.

**Kobayashi et al. disclose the following claimed limitations:**

\* a fan controller operable to stop said fan during a flushing operation in which said recording head jets ink particles through said nozzle (col 6, lines 18-20, figs 4-5) for the purpose of providing a strong flushing of the nozzles.

\* an ink absorbing member operable to absorb the ink particles jetted by said recording head through said nozzle based on the flushing signal, wherein said fan controller keeps said fan stopped at least until the ink particles jetted by said recording head through said nozzle based on the flushing signal arrive at or are caught by the ink absorbing member (col 6, lines 18-20, figs 4-5) for the purpose of providing a strong cleaning of the nozzles.

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**Barrett et al. discloses the following claimed limitations:**

\* a fan operable to prevent a temperature rise/cool fan module/ of said ink jet recording apparatus (col 3, lines 40-47, fig 1) providing a cooling module within the recording apparatus.

It would have been obvious at the time of the invention was made to a person having ordinary skill in the art to utilize a fan controller operable to stop said fan during a flushing operation in which said recording head jets ink particles through said nozzle, an ink absorbing member operable to absorb the ink particles jetted by said recording head through said nozzle based on the flushing signal, wherein said fan controller keeps said fan stopped at least until the ink particles jetted by said recording head through said nozzle based on the flushing signal arrive at or are caught by the ink absorbing member (Kobayashi et al.), a fan operable to prevent a temperature rise of said ink jet recording apparatus (Barrett et al.), taught by Kobayashi et al. and Barrett et al. into Saruta et al. for the purpose of providing a strong flushing of the nozzles, providing a strong cleaning of the nozzles, providing a cooling module within the recording apparatus, and providing a cooling module within the recording apparatus.

7. Claims 28, 33, 38 & 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saruta et al. (JP 08336970 A, IDS) in view of Raman et al. (4,730,197).

**Saruta et al. disclose all of the claimed limitations except for the following:**

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\* wherein said recording head is operable to jet the ink particles through said nozzle at a speed of 5m/s or above

\* wherein said recording head is operable to the jet ink particles through said nozzle at a speed of 4m/s or above, and each of the ink jet particles has a weight of 10ng or above

\* wherein the predetermined distance from said nozzle is 2mm

**Raman et al. disclose the following claimed limitations:**

\* wherein said recording head is operable to jet the ink particles through said nozzle at a speed of 5m/s or above/at least 2m/s/ (col 7, lines 59-60) for the purpose of achieving a sufficient velocity to the droplet of ink at the nozzle in order for it to travel to the printing surface.

\* wherein said recording head is operable to the jet ink particles through said nozzle at a speed of 4m/s or above, and each of the ink jet particles has a weight/fluid density, mass of substance per volume/ of 10ng or above (col 7, lines 59-60, col 15, lines 26-35) for the purpose of achieving a sufficient velocity to the droplet of ink at the nozzle in order for it to travel to the printing surface.

\* wherein the predetermined distance from said nozzle is 2mm (Table 4) for the purpose of achieving a sufficient velocity to the droplet of ink at the nozzle.

It would have been obvious at the time of the invention was made to a person having ordinary skill in the art to utilize a recording head wherein the recording head is operable to jet the ink particles through said nozzle at a speed of 2m/s or above; a recording head that is operable to the jet ink particles through said nozzle at a speed of 4m/s or above, and each of the ink jet particles has a weight/fluid density, mass of substance per volume/ of 10ng or above, and wherein the predetermined distance from the nozzle is 2mm, taught by Raman et al. into Saruta et al. for the purpose of providing an improved ink jet which produces optimal operating and fluidic parameter, for the purpose of achieving a sufficient velocity to the droplet of ink at the nozzle in order for it to travel to the printing surface and for the purpose of achieving a sufficient velocity to the droplet of ink at the nozzle.

8. Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over Saruta et al. (JP 08336970 A, IDS) in view of Kobayashi et al. (6,036,299).

**Saruta et al. disclose the following claimed limitation except for the following:**

\* wherein said flushing signal generating unit is operable to generate each of eh periodic pulses with a duration of 25 $\mu$ s, the first inclined section with a gradient of 10v/ $\mu$ s, the potential maintaining section with a level of 20V, and the second inclined section with a gradient of 9.6V/ $\mu$ s

**Kobayashi et al. discloses the following claimed limitation:**

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\* wherein there is a duration of each of the pulses, a gradient of the first inclined section, a level of the potential maintaining section, and a gradient of the second inclined section (col 11, lines 66-67, col 12, lines 1-26, figs 8a-8f).

**Kobayashi et al. does not disclose**

\* wherein said flushing signal generating unit is operable to generate each of eh periodic pulses with a duration of  $25\mu\text{s}$ , the first inclined section with a gradient of  $10\text{v}/\mu\text{s}$ , the potential maintaining section with a level of 20V, and the second inclined section with a gradient of  $9.6\text{V}/\mu\text{s}$

**However**, since it has been held that discovering an optimum value of a result effective variable and that discovering the optimum or workable ranges involves only routine skill in the art, *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980) and *In re Aller*, 105 USPQ 233, respectively. It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize a duration of each of the pulses is  $25\mu\text{s}$ , a gradient of the first inclined section is  $10\text{v}/\mu\text{s}$ , a level of the potential maintaining section is 20V, and a gradient of the second inclined section is  $9.6\text{V}/\mu\text{s}$  for the purpose of being capable of reliably overcoming faulty printing immediately after the cleaning operation.

9. Claim 37 & 39 is rejected under 35 U.S.C. 103(a) as being unpatentable over Saruta et al. (JP 08336970 A, IDS) in view of Kobayashi et al. (6,036,299).

**Saruta et al. disclose all of the claimed limitations except for the following:**

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\* wherein said flushing signal generating unit is operable to generate the flushing signal having a frequency of 10KHz or above.

**Kobayashi et al. disclose the following:**

\* wherein the predetermined distance/fixed interval from the nozzle (col 4, lines 25-38)

\* wherein said flushing signal generating unit is operable to generate the flushing signal having a frequency/the flashing signal has a frequency (figs 8a-8f)

However, since it has been held that discovering an optimum value of a result effective variable and that discovering optimum or workable ranges involves only routine skill in the art, *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980) and *In re Aller*, 105 USPQ233, respectively. It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize a flashing signal that has a frequency of 10kHs or above and having a predetermined distance from the nozzle that is 2mm for the purpose of providing an ink jet recording apparatus which is capable of recovering ink droplet discharging capabilities by allowing the ink with increased viscosity in the recording head to be discharged.

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### Communication With The USPTO

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to K. Feggins whose telephone number is 703-306-4548. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, B. Fuller can be reached on 703-308-0079. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

  
K. Feggins

November 26, 2003